```
#include<iostream>
#include<fstream>
#include <sstream>
using namespace std;
struct Node
{
        string name;
        long long int phone_number;
        Node *next;
        Node *prev;
};
class ContactBook
{
        Node *head;
        string x;      //names will be stored in x then will be stored in file
        long long int y; // phone number will be stored
        public:
                ContactBook()
                {
                        head=NULL;
                        x="";
                        y=0;
                }
        void CreateNode()   // to add contact
            {
                if(head==NULL)
                {
                Node *newer= new Node;
                    cout<<"  Name of Contact: ";
                        cin>>x;
                        newer->name=x;

                    cout<<"  Phone Number: ";
                    cin>>y;
                        newer->phone_number=y;f
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                        newer->next=NULL;
                        newer->prev==NULL;
                        head=newer;

                        cout<<"  Contact Added"<<endl;
                    }
                    else
                    {

                        Node *newer= new Node;
                    cout<<"  Name of Contact: ";
                        cin>>x;
                        newer->name=x;

                    cout<<"  Phone Number: ";
                    cin>>y;
                        newer->phone_number=y;
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                        newer->next=NULL;

                        Node *temp=head;            // created a new variable
and stored head in it
                                                                // while next !=
null, when next= null, means we have reached the last node
                        while(temp->next!=NULL)     // and we will change next
to newer and prev to temp
                        {                           // to attach new node with
other nodes
                                temp=temp->next;
                        }
                        temp->next=newer;
                        newer->prev=temp;
                        cout<<"  Contact Added"<<endl;
                        }
                }
        void Display()
        {
                Node *temp=head;
                int count=0;

                if(temp==NULL)
                {
                        cout<<"  No Contacts... Please Add Some Contacts"<<endl;
                        cout<<"  Thanks"<<endl;
                }
                else
                {
                        BubbleSort();
                        cout<<"  Name: "<<"      Number: \n"<<endl;
                        while(temp!=NULL)
                        {
                            count++;
                                cout<<"  "<<temp->name;
                                cout<<"          "<<temp->phone_number<<endl;
                        temp=temp->next;
                        }
                        cout<<"  Total contacts: "<<count<<endl;
                }
        }
        int Search()
        {
                bool check=false;
                Node *temp=head;
                cout<<"***********"<<endl;
                cout<<"  Press 1 if you want to Search By Name."<<endl;
                cout<<"  Press 2 if you want to Search By Number."<<endl;
                int command;
                cout<<"  Enter the Command: ";
                cin>>command;

                if(command==1 && temp!=NULL)
                {
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                        cout<<"  Enter the Name to Search: ";
                        cin>>x;
                        while(temp!=NULL)
                        {
                                if(temp->name==x)
                                {
                                        cout<<"***********"<<endl;
                                        cout<<"  Name: "<<temp->name<<endl;
                                        cout<<"  Phone
Number:"<<temp->phone_number<<endl;
                                        cout<<"***********"<<endl;
                                        check=true;
                                        break;
                                }
                                temp=temp->next;
                        }
                        if(check==false)
                        {
                                cout<<"  Name Not Found"<<endl;
                                }
                }
                else if(command==2)
                {
                        cout<<"  Enter the Number to Search: ";
                        cin>>y;

                        while(temp!=NULL)
                        {
                        if(temp->phone_number==y)
                                {
                                        cout<<"***********"<<endl;
                                        cout<<"  Name: "<<temp->name<<endl;
                                        cout<<"  Phone Number:
"<<temp->phone_number<<endl;
                                        cout<<"***********"<<endl;
                                        check=true;
                                        break;
                                }
                                temp=temp->next;
                        }
                                if(check==false)
                                {
                                        cout<<"  Number Not Found"<<endl;
                                }
                }
            }
            void DeleteAllContacts()
            {
                Node *temp=head;
                Node *temp2;
                if(head==NULL)
                {
                        cout<<"  Already Contact Book is Empty"<<endl;
                        cout<<"***********"<<endl;
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                        }
                        else
                        {
                                while(temp!=NULL)
                                {
                                        temp2=temp;
                                        temp=temp->next;
                                        delete temp2;
                                }
                                head=NULL;
                                cout<<"  Successfully Deleted All
Contacts"<<endl;
                        cout<<"***********"<<endl;
                        }
                }

                int DeleteContactBySearch()
        {

                Node *temp=head;
                cout<<"***********"<<endl;
                cout<<"  Press 1 if you want to Search By name"<<endl;
                cout<<"  Press 2 if you want to Search By Number"<<endl;
                int command;
                cout<<"  Enter the Command: ";
                cin>>command;

                if(command==1)
                {
                        bool Dcheck=false;
                        cout<<"  Enter the Name to Delete: ";
                        cin>>x;
                        while(temp!=NULL)
                        {
                        if(temp->name==x)     // checks if name exists or not
                                {
                                        cout<<"***********"<<endl;
                                        cout<<"  Name: "<<temp->name<<endl;
                                        cout<<"  Phone Number:
"<<temp->phone_number<<endl;
                                        cout<<"***********"<<endl;
                                        Dcheck=true;
                                        break;
                                }
                                temp=temp->next;
                        }
                        if(Dcheck==true)
                        {                           // if it exists then this
code line will follow
                        int command;
                        cout<<"  Press 1 to Delete the Contact: ";
                        cin>>command;
                        if(command==1 & temp==head)
                        {
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                                Node *temp1;
                                temp1=temp;
                                temp=temp->next;
                                delete temp1;

                                temp->prev=NULL;
                                head=temp;
                                cout<<"  Contact Deleted Success Fully"<<endl;
                                }
                                else if(command==1 & temp->next==NULL)
                                {
                                        temp->prev->next=NULL;
                                        delete temp;
                                        cout<<"  Contact Deleted Success
Fully"<<endl;
                                }
                                else if(command==1)
                                {
                                        Node *temp1;
                                        temp1=temp;
                                        temp->prev->next=temp1->next;
                                        temp->next->prev=temp1->prev;
                                        delete temp1;
                                        cout<<"  Contact Deleted Success
Fully"<<endl;
                                }
                                else
                                {
                                        cout<<"  You Enter Wrong Command ... Try
Again"<<endl;
                                }
                    }
                    else if(Dcheck==false)
                                {
                                        cout<<"  Contact of This Name Not
Found."<<endl;
                                }
                }
                else if(command==2)
                {
                        bool Dcheck=false;
                        cout<<"  Enter the Number to Delete: ";
                        cin>>y;
                        while(temp!=NULL)
                        {
                        if(temp->phone_number==y)
                                {
                                        cout<<"***********"<<endl;
                                        cout<<"name: "<<temp->name<<endl;
                                        cout<<"Phone Number:
"<<temp->phone_number<<endl;
                                        cout<<"***********"<<endl;
                                        Dcheck=true;
                                        break;
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                        }
                        temp=temp->next;
                    }
                    if(Dcheck==true)
                    {
                    int command;
                    cout<<"  Press 1 to Delete the Contact: ";
                        cin>>command;
                    if(command==1 & temp==head)
                    {
                        Node *temp1;
                        temp1=temp;
                        temp=temp->next;
                            delete temp1;

                        temp->prev=NULL;
                        head=temp;
                        cout<<"  Contact Deleted Success Fully"<<endl;
                        }
                            else if(command==1 & temp->next==NULL)
                        {
                            temp->prev->next=NULL;
                            delete temp;
                            cout<<"  Contact Deleted Success
Fully"<<endl;
                            }
                            else if(command==1)
                        {
                            Node *temp1;
                            temp1=temp;
                            temp->prev->next=temp1->next;
                            temp->next->prev=temp1->prev;
                                delete temp1;
                            cout<<"  Contact Deleted Success
Fully"<<endl;
                        }
                            else
                            {
                                cout<<"  You Enter Wrong Command ... Try
Again"<<endl;
                            }
                }
                else if(Dcheck==false)
                        {
                            cout<<"  Contact of This Name Not
Found."<<endl;
                        }
            }
            else
            {
                    cout<<"  You Enter wrong Command"<<endl;
                    }
        }
        void BubbleSort()
```

```
{
        Node *temp=head;
    Node *i,*j;
    string n;
    long long int n2;
    if(temp=NULL)
    {
        cout<<"  Empty contact Book"<<endl;
                }
                else
                {
    for(i=head;i->next!=NULL;i=i->next)
    {
        for(j=i->next;j!=NULL;j=j->next)
        {
            if(i->name>j->name)
                    {
                n=i->name;
                i->name=j->name;
                j->name=n;

                n2=i->phone_number;
                i->phone_number=j->phone_number;
                j->phone_number=n2;
            }
        }
    }
}


int EditContacts()
{
        Node *temp=head;
        cout<<"***********"<<endl;
        cout<<"  Press 1 if you want to Search By Name"<<endl;
        cout<<"  Press 2 if you want to Search By Number"<<endl;
        int Ecommand;
        cout<<"  Enter the Command: ";
        cin>>Ecommand;

        if(Ecommand==1)
        {
                bool Echeck=false;                    // to search the
contact
                cout<<"  Enter the Name to Edit: ";
                cin>>x;
                while(temp!=NULL)
                {
                if(temp->name==x)
                        {
                                cout<<"***********"<<endl;
                                cout<<"Name: "<<temp->name<<endl;
                                cout<<"Phone Number:
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"<<temp->phone_number<<endl;
                                        cout<<"***********"<<endl;
                                        Echeck=true;
                                        break;
                                }
                                temp=temp->next;
                        }
                        if(Echeck==true)
                        {
                        int command;
                            cout<<"  Press 1 to Edit the Contact: ";
                        cin>>command;
                            if(command==1)
                            {
                                    cout<<"  Enter New Name: ";
                                cin>>x;
                                cout<<"  Enter New Number: ";
                                cin>>y;

                                temp->name=x;
                                temp->phone_number=y;

                                    cout<<"  Contact Edited Success
Fully"<<endl;
                                }
                                else
                                {
                                            cout<<"  You Enter Wrong Command ...
Try Again"<<endl;
                            }
                        }
                        else if(Echeck==false)
                        {
                            cout<<"  Contact Not Found"<<endl;
                                }
                }
                else if(Ecommand==2)
                {
                        bool Echeck=false;
                        cout<<"  Enter the Number to Edit: ";
                        cin>>y;
                        while(temp!=NULL)
                        {
                        if(temp->phone_number==y)
                                {
                                        cout<<"***********"<<endl;
                                        cout<<"Name: "<<temp->name<<endl;
                                        cout<<"Phone Number:
"<<temp->phone_number<<endl;
                                        cout<<"***********"<<endl;
                                        Echeck=true;
                                        break;
                                }
                                temp=temp->next;
```

```
                        }
                        if(Echeck==true)
                        {
                        int command;
                            cout<<"  Press 1 to Edit the Contact: ";
                        cin>>command;
                            if(command==1)
                            {
                                    cout<<"  Enter New Name: ";
                                cin>>x;
                                cout<<"  Enter New Number: ";
                                cin>>y;

                                temp->name=x;
                                temp->phone_number=y;

                                    cout<<"  Contact Edited Success
Fully"<<endl;
                                }
                                else
                                {
                                            cout<<"  You Enter Wrong
Command"<<endl;
                        }
                        }
                        else if(Echeck==false)
                        {
                            cout<<"  There is No Contact of this Number."<<endl;
                    }
                }
                else
                        {
                            cout<<"  You Enter Wrong Command ... Try
Again"<<endl;
                        }
            }


        void OflineSave()             // to store data in file
        {
                Node *temp=head;
                ofstream myfile ("contactbook.txt");  // Either ofstream or
fstream object may be used to open a file for writing
            if (myfile.is_open())               //Check if a file is open
                                                //Returns whether the stream is
currently associated to a file.
            {
                while(temp!=NULL)
                        {
                            myfile<<temp->name<<endl;
                                myfile<<temp->phone_number<<endl;
                        temp=temp->next;
                        }
                myfile.close();          //close() closes a file descriptor, so
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that it no longer refers to any file and may be reused.
                Structure();
            }
            else
            {
                cout<<"  Thanks file is empty."<<endl;
                        }
                }

                void reopenCB()           // reads data from the file
                {
                        bool isEmpty;
                        ifstream myfile ("contactbook.txt");
//ifstream is an input file stream. It is a special kind of an istream that
reads in data from a data file
            if (myfile.is_open() & myfile.peek() != EOF)              //return a
next character in the input string.


            {
                int i=0;
                while(getline(myfile,x))  // getline() is a standard library
function that is used to read a string or a line from an input stream. It is a
part of the <string>
                {
                    if(i % 2 == 0)
                                        {
                                                if(head==NULL)
                                  {
                                Node *newer= new Node;
                                newer->name=x;

                                    newer->next=NULL;
                                    newer->prev==NULL;
                                    head=newer;
                                      }
                                                else
                                                {
                                                        Node *newer= new Node;

                                                        newer->name=x;
                                                        newer->next=NULL;

                                                        Node *temp=head;
                                        while(temp->next!=NULL)
                                        {
                                                temp=temp->next;
                                        }
                                        temp->next=newer;
                                        newer->prev=temp;
                                                }
                     }
                    else
                     {
```

```
                        Node *temp=head;
                        if(temp->phone_number==0)
                        {

                                stringstream convert(x); //A stringstream
associates a string object with a stream allowing you to read from the string as
if it were a stream (like cin).
                                        convert>>y;
                                temp->phone_number=y;
                                                }
                                                else
                                                {
                                                        Node *temp=head;
                                        while(temp->next!=NULL)
                                        {
                                                temp=temp->next;
                                        }

                                        stringstream convert(x);
                                        convert>>y;
                                        temp->phone_number=y;

                                                }

                                    }
                    i++;
                }
                myfile.close();
            }
            else
            {
                cout<<"  File is Empty so Cannot open...Sorry"<<endl;
                        }
                }
                void Structure()
        {
                cout<<"***********"<<endl;
                cout<<"  1. Add Contact"<<endl;
                cout<<"  2. Edit the Contact"<<endl;
                cout<<"  3. Delete Contact"<<endl;
                cout<<"  4. Search Contact"<<endl;
                cout<<"  5. Display All Contacts"<<endl;
                cout<<"  6. Delete All Contacts"<<endl;
                cout<<"***********"<<endl;

                int Scommand;
                cout<<"  Enter the Command: ";
                cin>>Scommand;
                try
                {
                        if(Scommand>=1&&Scommand<=6)
                        {
                                if(Scommand==1)
                        {
```

```
                                CreateNode();
                                OflineSave();
                                Structure();
                        }
                        else if(Scommand==2)
                                {
                                        EditContacts();
                                        OflineSave();
                                        Structure();
                                }
                        else if(Scommand==3)
                        {
                                DeleteContactBySearch();
                                Structure();
                        }
                        else if(Scommand==4)
                        {
                                Search();
                                Structure();
                        }
                        else if(Scommand==5)
                        {
                                Display();
                                OflineSave();
                                Structure();
                        }
                        else if(Scommand==6)
                        {
                                DeleteAllContacts();
                                OflineSave();
                                Structure();
                                }
                                }
                                else
                                {
                                        throw(Scommand);
                                }
                        }
                        catch(int Scommand)
                        {
                                cout<<"  You Enter wrong Command... Run the Code
Again"<<endl;
                                Structure();
                        }
            }

};

int main()
{
    ContactBook cb;
    cb.reopenCB();
        string n;
        cout<<"  What is Your Name: ";
```

```
        cin>>n;

    cout<<"***********"<<endl;
        cout<<"  "<<n<<"  WELCOME TO CONTACTBOOK      "<<endl;
        cout<<"***********"<<endl;
        cb.Structure();
        return 0;
}
```